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Side by Side: What a Comparative Usability Study Told Us About a Web Site Redesign

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Library Web sites must compete against easy-to-use sites, such as Google Scholar, Google Books, and Wikipedia, for students' time and attention. Library Web sites must therefore be designed with aesthetics and user perceptions at the forefront. The Music and Performing Arts Library at Urbana-Champaign's Web site was overcrowded and in much need of a user-focused redesign. This article presents a usability study that compared participants' use of the old site versus the new site to determine if performance improved on the redesigned site. Participants were asked to complete library-related tasks on both the old Web site and on the redesigned Web site to determine if they could both complete more tasks and complete tasks more quickly on the new site. Participants showed a marked improvement on the new site, and their "think-out-loud" responses to the tasks helped further improve site design and wording. Participants were also surveyed about their perceptions of ease of use and navigation on the old and new sites, and in general, the new site was preferred by participants and seen as a great improvement. Future studies will aim to further involve students and faculty in addressing terminology and site organization.

KEYWORDS library Web site, redesign, Web usability, testing, academic library, comparative usability studies

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With many academic library reference desks fielding fewer questions, the library's Web site often becomes the first (and sometimes only) connection a student has with the library when conducting research. Libraries face more competition now than ever before in attracting users to their Web sites and holding their attention long enough for them to discover the specialized tools available to accomplish their research. Users are frustrated by poorly designed library Web sites filled with too much library jargon, including endless acronyms for names of databases and tools, too much text, and confusing navigation options, and will quickly turn to Google or Wikipedia. These alternative tools attract users for many reasons, not least of which is ease of entry. If libraries want to compete for users who have ever-increasing expectations of the Web environment, then it is important for libraries to design their Web sites by following the principles of Web usability. Librarians do not need to think just like their users, but they need to observe how their users navigate and use the library's Web resources. The Music and Performing Arts Library (MPAL) at the University of Illinois at Urbana-Champaign took the opportunity during a recent Web site redesign to conduct usability testing in order to better connect with users.

BACKGROUND

The MPAL was, in fiscal year 2008, the University of Illinois Urbana-Champaign's second busiest library based on circulation statistics and third busiest based on patron counts. It serves the School of Music and department of dance as well as the department of theatre, which was added in summer 2008. With collections totaling more than 750,000 items, including books, scores, journals, microfilms, sound and video recordings, and special collections, the MPAL is among the largest music libraries in the United States. The MPAL supports comprehensive degree programs in music performance, music education, musicology, ethnomusicology, music theory, and composition. In addition, it supports degree programs at the undergraduate and graduate levels in the dance and theatre departments. More than 1,000 students are enrolled in these programs, which have about 150 classroom and applied faculty. The collections and services of the MPAL are also used by a diverse clientele from the local and state communities and by scholars from across the United States and from other countries. These varying user groups each approach the library with different needs and expectations. The research methodologies and tools vary for each discipline, as do the needs of faculty compared to students in each area.

One issue faced by the MPAL Web site is its role as a branch library site. Users also have the option of using the main University Library Web site as their gateway to research tools. But MPAL librarians encourage music, dance, and theatre users to start from the MPAL site, as it contains content selected

and organized specifically for them. However, throughout the course of their studies, patrons may be more familiar with the main library Web site. As Virginia Baldwin and Anita Breckbill (2002) found in their study of academic libraries' use of main or branch library Web pages as the default page on public computers in branch libraries, some academic library systems require that all campus libraries use the same home page on public computers, while others allow branches to use their own home page as the default. Since the MPAL has chosen to use its own home page, we must be conscious of how its page relates to the University Library site as a whole.

The MPAL's Web site serves as a gateway to not only the physical collections in the stacks but also to the numerous specialized electronic resources available to researchers. Anecdotal evidence suggests some campus librarians considered the MPAL Web site a leader in good library Web design in the late 1990s. However, by 2007, it had outlived its usefulness; a major revision was long overdue. The site's layout was crowded and confusing. Much of the screen real estate was taken up by announcements and news that users admitted to skipping as they scrolled down the page to locate the links they needed, which were arranged in seven categories (see Figure 1).

On the main page, 77 links were available. Compounding users' confusion were the dual navigation systems—one along the top, which was internal to the site, and one along the side, which was for the University Libraries as a whole. There was little in the layout or link titles to make it clear to users which set of navigation links led where until they had already clicked away from the MPAL site.

Besides its out-datedness, two main factors led to the need to redesign the site: the University Library's move to a content management system (Alkacon Software's OpenCMS, http://www.opencms.org/en/) for its Web sites and the need to balance and expand the Web site's content with the addition of the theatre collection to the MPAL's holdings. In fall 2007, the University Library implemented a content management system and indicated that all library Web sites would need to be converted. At about this time, talks began around the possibility of incorporating the theater collection into the Music Library, as it was then known; the library had already included the dance collection since the 1980s. The library was renamed the MPAL to reflect its new status as a true performing arts library.

To prepare for the redesign, the MPAL's newly appointed user services librarian (Kirstin Dougan) and an MPAL graduate assistant, a student in the Graduate School of Library and Information Science with an undergraduate degree in music, began to inventory the contents of the MPAL Web site. In-house Web statistics software was used to conduct an analysis on the overall number of hits each Web page obtained over the previous two years. Pages that received fewer than 100 hits per semester would be given special scrutiny to determine whether their content could be deleted or moved to

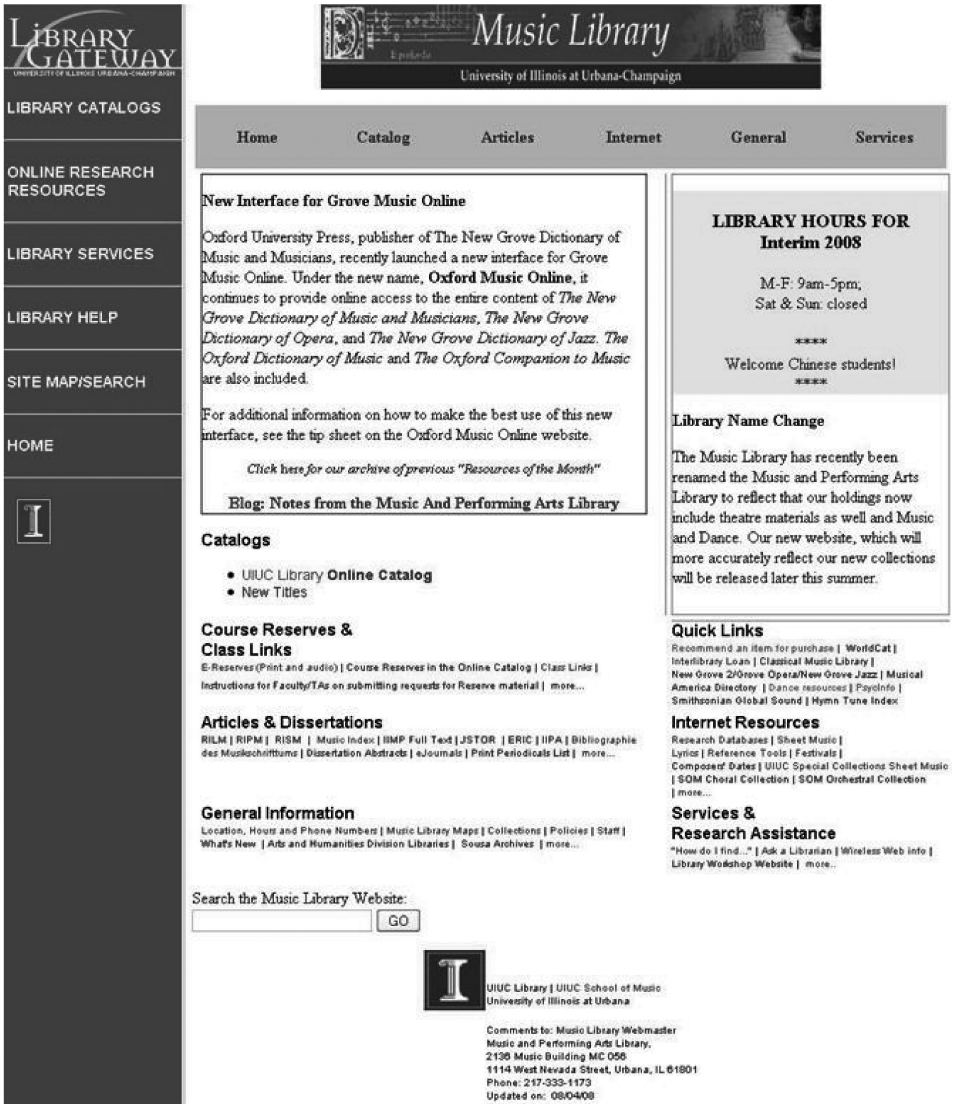

FIGURE 1 Old MPAL home page.

other pages. Ways to reorganize the overall content of the site and how to integrate the newly added theatre resources were considered. The new site's structural organization was contemplated, making sure each piece of content would have a logical home. At this stage the help of Camilla Fulton, the assistant Web content and digital services librarian, was enlisted.

With the team assembled, issues of standards and accessibility began to considered. Fortunately, the content management system supplied the styling and necessary structuring to pass World Wide Web Consortium standards. In designing the mock-up of the new site, particular attention was paid to the structural order of headings and consistent navigation. In spring 2008,

FIGURE 2 The prototype of the new MPAL home page.

after the prototype (see Figure 2) was complete in the content management system, the new site was presented to the MPAL's faculty and staff. This served to update them on the redesign's progress, give them an idea of what the finished site might look like, and to solicit feedback.

Problem Statement

When the redesigned prototype was complete, it was decided a usability study would provide much-needed user input about the redesigned site. A study that compared the effectiveness of the old and new sites was formulated. The main objective was to determine whether the new site prototype was easier for users to navigate than the old site and whether they could find key information on the new site. Two smaller objectives emerged: (1) Do users demonstrate an understanding of library tools and terminology? and (2) Is there any difference in searching behavior between the different user groups (i.e., undergrads/faculty/staff)? Traditionally, usability tests evaluate only Web sites, not users, so the results in the last two objectives are purely observational rather than part of the usability test.

LITERATURE REVIEW

Several texts offered basic introductions to Web usability testing and design, including Steve Krug's *Don't Make Me Think!* (2000), Elaina Norlin and C. M. Winter's *Usability Testing for Library Web Sites* (2002), and Jakob Nielsen's

invaluable *Alertbox* column (1995–2009; http://www.useit.com). Nearly all usability studies employed some form of interviewer/interviewee construct. The interviewers delivered task-based questionnaires and often followed with written surveys. Some studies also incorporated card sorts, a method by which participants sort cards with terms into categories of their own choosing. These sorts helped librarians gain an understanding of users' perspective concerning library jargon (Robbins et al. 2007).

The past few years have yielded an increase in studies on the impact of Web site design on its users. David Robins and Jason Holmes (2008) found "the higher the aesthetic quality of a site, the higher the [user ranks its] credibility" (393). The Institute for Dynamic Educational Advancement's research observed that "easy access to complete information is key to visitor enjoyment" (2008, 2). And not surprisingly, Muzeyyen Pandir and John Knight (2006) showed "high scores of [pleasurable Web sites correlate] with low and medium levels of complexity." In their study, complex Web sites were given the adjectives of "confusing," "intense," and "unordered" (1362). Web-design aesthetics are unavoidable when competing with popular search engines like Google Scholar and Wikipedia. These sites are heralded by information seekers because of their perceived design simplicities. Though the library Web site may lead users to more valuable resources for research, its lack of organization could impress upon the user a sense of unprofessionalism and unreliability.

Barbara Cockrell and Elaine Anderson Jayne (2002) found that students had "widespread confusion about the article-finding process," which led to the inclusion of tasks related to that process (122). They found only one-third of their participants were able to correctly locate a journal article. Participants had various difficulties with the task, ranging from selecting an appropriate journal database to selecting a journal article and not a news story or popular article. Almost half thought the Online Public Access Catalog (OPAC) was the tool to use for finding magazine and journal articles. This article also offers a very helpful "Recommendations" section for library Web site designers.

One study that was particularly inspiring is "Functional by Design: A Comparative Study to Determine the Usability and Functionality of One Library's Web Site" (Graham, Poe, and Weatherford 2003), which was the only study that looked for an improvement in users' abilities to use a library Web site post-redesign. A similar methodology was chosen for this study since the overall aim was to determine if the new Web site was easier for users to navigate.

METHODOLOGY

The prototype for the MPAL's new Web site had already been completed before a usability study was conducted (see Figure 2). In spring 2008, the

authors created the protocols for the testing. A think-out-loud task-based usability test was developed, which was to be completed on the old and the new sites, as well as a post-test survey that would allow participants to share their demographic information and provide subjective feedback about their experience with both the old and new sites. All recruitment materials were drafted and submitted, along with a detailed application for approval, to the University's Institutional Review Board. After receiving approval for the study, the protocols were pre-tested by an MPAL graduate assistant (not the same one who helped with the redesign but one who is also a graduate student in the School of Library and Information Sciences).

Participants were recruited using a variety of methods. Calls for participants were posted in the music building and in the MPAL itself. Notices were posted on the MPAL Web site and on its blog. Participants were required to be faculty, students, or staff and have at least some familiarity with the MPAL and its Web site. Employees of the MPAL, including student workers, were not eligible as it was felt that their familiarity with the old site would skew results. Interested participants were instructed to e-mail the researchers indicating their position in the University and their familiarity with the MPAL Web site. Participants were offered a $10 gift card to a nearby coffee shop as incentive. Applicants were accepted on a rolling basis, and tests occurred from June through August 2008.

Although some studies claimed that only five users needed be tested to reveal the majority of a site's problems (Nielsen 2000), fifteen users were tested. Jakob Nielsen (2006) also suggests twenty users would be ideal when conducting a purely qualitative test; however, this test contained both qualitative and quantitative measures. The hope was that fifteen users would allow a representative sample across all of our various user populations (music, dance, theater, faculty, staff, and students). Although a good sample was obtained, it might have been better to have two or three iterative testing sessions each with five to six participants; as the redesign progressed, similar feedback was given from the participants about layout and wording.

Tests were scheduled for one-hour intervals, although the pre-test indicated that most tests would likely take 45 minutes or less. Tests were held in Dougan's office because it provided the necessary software and privacy to conduct the tests. Fulton read the introduction, which was scripted so each participant would receive the same instructions. The test protocol was directed by Dougan, who reiterated instructions as necessary and read the tasks to the participants. Fulton recorded observations. Each participant signed consent forms necessary for the Institutional Review Board (IRB) process.

The usability test consisted of two eleven-task sets, one for the old site and one for the new site. The questions for each site were very similar and tested both factual information (staff phone numbers, locations of materials in the library) and conceptual knowledge ("Does the Library own a particular

TABLE 1 Task List

Factual tasks:
Task 2—Locate a list of the Special Collections available in the Music and Performing Arts Library.
Task 4—Find a link on the Web site to the Inter Library Loan form.
Task 8—Does the Music and Performing Arts Library offer online chat reference service?
Task 9—What is the name and e-mail address of the head of the Music and Performing Arts Library? (*On new site: a Music and Performing Arts Library Graduate Assistant*)
Task 11—On what floor of the Library are the listening carrels? (*On new site: periodicals*)
The series of tasks above could be found directly on the Music and Performing Arts Library Web site. The participants did not need familiarity with library resources and tools to complete the task.
Conceptual tasks:
Task 1—Locate a class guide for the Vocal Literature class (*On new site: String Literature class*).
Task 3—Find a journal article about a Beethoven symphony.
Task 5—Find a link to a site that will help you create citations for your research papers.
Task 6—Does the Library own a score (printed music) of selections from the musical Wicked? (*On new site: Rent*)
Task 7—Find an online German dictionary.
Task 10—Does Professor Erik Lund have any audio tracks on e-reserve this semester? (*On new site: Professor Zack Browning*)
In order to complete the tasks above, participants needed familiarity with certain library resources and tools.

item?" or "Find a journal article about a Beethoven symphony"). The conceptual tasks served to test two questions: did participants know which kind of tool to use to complete the task/answer the question, and could they find the tool(s) on both the old site and the new site? We hoped that comparing the two sites would show if the new site improved user performance. To allow for participants having some familiarity with the old site, whether each participant began with the old or new site was alternated. This also addressed the fact that by completing one set of tasks, users would learn about the tools and terminology of the library in general. By having half the users complete tasks on the new site first and then progressing to the old site, this learning curve should have been minimized in the results. For a complete list of tasks/questions, see Table 1.

Participants were repeatedly reminded that the design of the sites were being tested, not their ability. Rather than set time restrictions on each question, users were permitted to take as long as they liked, but that if they felt they could not locate the answer, they could give up on a question and be given the answer. The tests were recorded using TechSmith's Camtasia software (http://www.techsmith.com/camtasia.asp) and a USB microphone. This allowed us to document participants' clicks and mouse movement, which can be as revealing as actual clicks, and their "think-out-loud" commentary.

After they completed the usability tests, participants were asked to complete a brief survey (see http://hdl.handle.net/2142/11944 for survey and session script) that allowed them to provide demographic information and more objective feedback on the two sites. In the process of analyzing the collected data, the Camtasia recordings for each participant were reviewed and the following was recorded:

1. The time in seconds to complete each task (or until giving up)
2. The number of clicks to complete the task (with a separate count for "Back" button)
3. Whether the participant reached the answer on his or her own
4. How many times clarification was requested (if any)
5. Whether, at any point, the participant navigated away from the MPAL Web site unnecessarily
6. Whether, at any point, the participant moused over or otherwise was about to click on the correct link and did not
7. Observations about participants' familiarity with library terminology

For each site, one additional question asked where something was located in MPAL, and we noted whether the participant used the library maps or the relevant Web page with text-based information to answer the questions.

RESULTS

Demographics

As previously mentioned, fifteen participants were recruited for this study. All fifteen were affiliated with the University of Illinois and used the MPAL for their research. Of the fifteen participants, ten were graduate students, two were faculty/staff, two were sophomores, and one was a junior (see Figure 3). One graduate student also identified him/herself as staff. Six participants claimed to frequent the Web site more than once a week, six participants claimed to frequent once a week, and three claimed to frequent it occasionally. Ten participants were affiliated with the music department, two participants were affiliated with performing arts, and three held affiliations unrelated to either. The final three participants, however, frequented the Web site enough to qualify for inclusion in our study.

Timed Sessions

Each participant attempted to find answers to the tasks given them (eleven on the old site and eleven on the new site). The start time began immediately

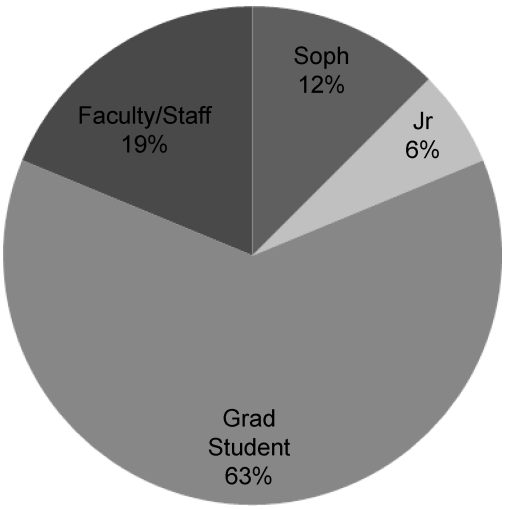

FIGURE 3 Participants' university status.

after the task was read to participants, and the end time was calculated when participants either completed the task or gave up their search. Only when participants gave verbal notification of giving up was there intervention in any way. Also participants' search time not capped, in order to avoid making them feel rushed or discouraged.

All even-numbered participants (P2, P4, P6, P8, P10, P12, and P14) began on the old site for the first phase of the study. With all data acquired and analyzed (see Figure 4), Task 1, "Locate a class guide for the vocal literature class," took the participants the longest on average to complete (92.6 seconds). Task 6, "Does the Library own a score (printed music) of selections from the musical *Wicked*?" had the shortest, an average of 7.8 seconds. When focusing on completed tasks only, the longest and shortest times were connected to the same tasks. Their average times were 130.7 seconds and 7.8 seconds, respectively.

In the second phase of the study using the new site, Task 3, "Find a journal article about a Beethoven symphony," took the longest on average (53.5 seconds), while Task 4, "Find a link on the Web site to the Inter Library Loan form," took the shortest (10.4 seconds). When isolating completed tasks, Task 5, "Find a link to a site that will help you create citations for your research papers," took the longest (35.3 seconds), on average, and Task 4 still took the shortest (10.4 seconds).

All odd-numbered participants (P1, P3, P5, P7, P9, P11, P13, and P15) began on the new site for the first phase of the study. With all data acquired and analyzed (see Figure 5), Task 1 took the participants the longest on average to complete (73.9 seconds). Task 10, "Does Professor Erik Lund have any audio tracks on e-reserve this semester?" took the participants the

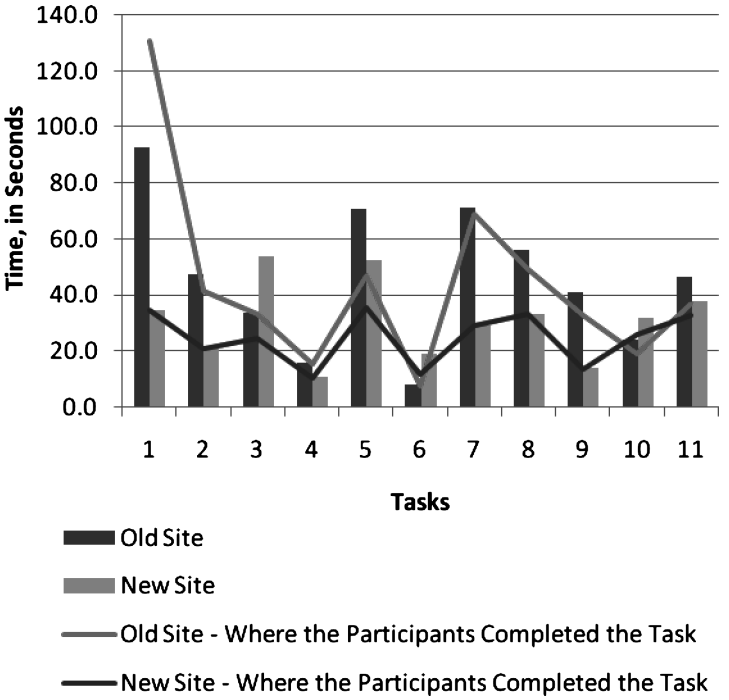

FIGURE 4 Average time for each task for participants starting on the old site.

shortest average time (12.9 seconds). When isolating completed tasks, the longest and shortest times were connected to the same tasks. Their average times were 65.3 seconds and 12.9 seconds, respectively.

In the second phase of the study (the old site), Task 5 took the longest on average (143.9 seconds), while Task 4 took the shortest (13.9 seconds). When isolating completed tasks, the longest and shortest times were connected to the same tasks. Their average times were 179.0 seconds and 13.9 seconds, respectively.

Analysis for Timed Sessions

Skewed results occurred on two tasks for the old site: "Locate a class guide for the Vocal Literature class" and "Find a link to a site that will help you create citations for your research papers." These unnatural spikes in data can be seen in Figure 4 for Task 1 and Figure 5 for Task 5. We believe this signified participants who were unwilling to give up on finding an answer. In some cases, participants verbalized frustration and confusion—"I know it's here somewhere!"—the exact feelings we wished to avoid with the new site.

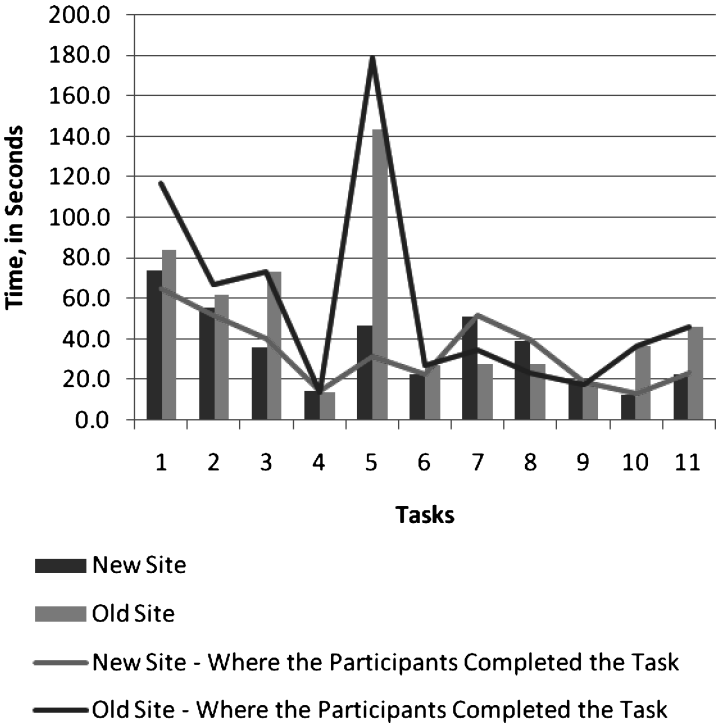

FIGURE 5 Average time for each task for participants starting on the new site.

The outlier in Figure 4 relating to Task 1 likely occurred because participants were not familiar with the MPAL's class guides. Professors and students are usually exposed to these guides after receiving special instruction from a librarian. Many participants assumed "class guides" were equivalent to either e-reserves or course descriptions. All participants needed a definition for "class guide." The skewed result in Figure 5 relating to Task 5 occurred because of the organization and categorization of the old Web site. Those participants who made it to the "Services & Research Assistance" page did not assume a site to "help ... create citations" would be linked under the "Services" heading.

Despite the skewed results, the average task completion times showed participants completed tasks more quickly on the new site. Where participants started the first phase on the old site, the exceptions were Task 6 and Task 10. Where participants started the first phase on the new site, the exceptions were Tasks 4, 7, 8, and 9. These exceptions, however, vary by less than 25 seconds. In most cases, the difference is less than fifteen seconds. Of all exceptions, Task 7, "Find an online German Dictionary," has the largest average time difference, 23.9 seconds.

Even more interestingly, nine of eleven tasks (2, 3, 4, 5, 6, 8, 9, 10, and 11) could be completed in one click on the old site because so many links

TABLE 2 Success Versus Failure

	Participants starting on the old site first		Participants starting on the new site first	
	Old site	New site	New site	Old site
Complete	70/88 (80%)	78/88 (89%)	70/77 (91%)	64/77 (83%)
Incomplete	18/88 (20%)	10/88 (11%)	7/77 (9%)	13/77 (17%)

were located on the MPAL home page. On the new site, only four of eleven tasks (3, 6, 7, and 8) could be completed in one click, with the remaining tasks requiring two to three clicks on average. Despite the increase in total clicks needed, the new site still outperformed the old in terms of time. Some participants even stated they would rather click more to find what they need as long as they could understand the general structure of how the information is being presented. Again, the hard-to-read font and plethora of links on the old Web site's home page served as a hindrance, rather than a help, when finding information.

Success versus Failure

Special note was also taken of which tasks were completed and which tasks participants failed to complete (see Table 2). Of the fifteen participants, eight started on the old site first; they had a combined total of 176 possible answers found (88 on the old and 88 on the new). The seven participants starting on the new site first had a combined total 154 possible answers found (77 on the new and 77 on the old).

The participants starting on the old site found a total of 148 answers, with 70 answers found on the old site and 78 answers found on the new. The participants starting on the new site found a total of 134 answers, with 64 answers found on the old site and 70 answers found on the new (see Table 2).

The participants had a higher completion rate on the new site, regardless of where they started. This rate, in comparison to the old site, shows a difference of 8–9 percentage points. Though not terribly disparate, the difference in percentages suggests improved performance on the new site.

Participant Feedback: Rankings

At the Web study's completion, each participant was given a paper survey. The first evaluative questions asked them to rate the old and new Web sites on ease of use (see Figure 6). With a scale of 1 through 5, 1 being difficult and 5 being easy, participants gave the old Web site an average ranking of 3. They gave an average ranking of 4 to the new Web site.

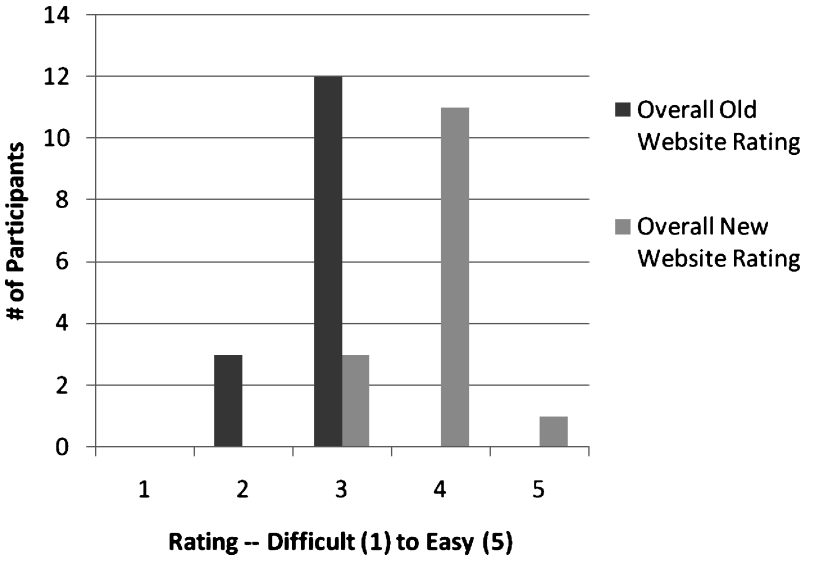

FIGURE 6 Overall old versus new Web site perceptions.

Participants were also asked to rate the overall effectiveness and navigation of both sites, using a scale of 1 (very ineffective) through 5 (very effective). The most common rating for the old site was 3, given by eight of fifteen participants. Thirteen of fifteen participants gave the new Web site a rating of 4 (see Figure 7).

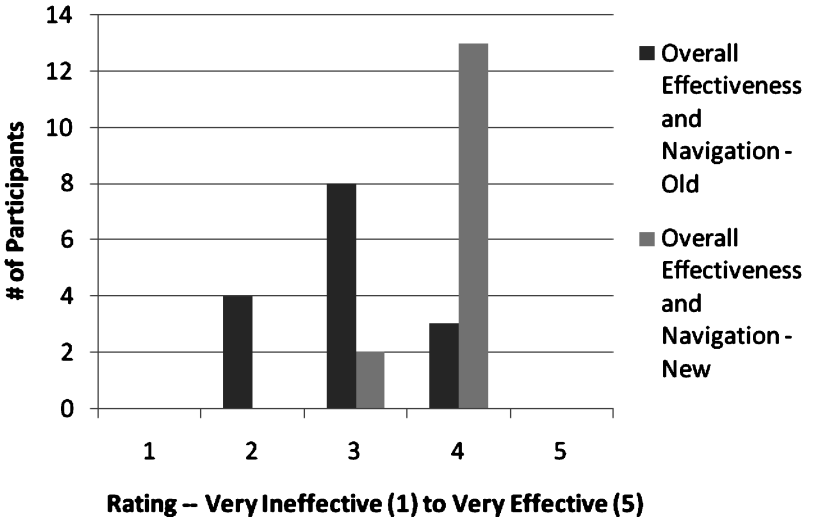

FIGURE 7 Overall old versus new effectiveness and navigation.

When asked to compare the sites based on the tasks they completed, twelve participants perceived the new Web site's navigation to be easier. Two perceived the old easier to navigate, and one perceived them to be equal. Eight participants thought that finding journal articles on the new Web site was easier, while five found the old Web site easier. Two found the task equally easy on both sites. Seven participants thought finding course reserves was easier on the new site, as opposed to five thinking the old was easier. Three thought they were equal.

PARTICIPANT FEEDBACK: QUALITATIVE

Jargon

The written survey concluded with questions about both sites' use of jargon and overall appearance. All participants found the phrase "class guides" to be confusing. They all needed a definition of the term before proceeding with their search. One participant found the phrase "Special Collections" too general of a term. The participant stated that he/she "would probably not realize which music would be considered a part of the special collections." We then asked participants if any other terms on the new Web site confused them. Seven participants offered the responses, which are listed in Table 3.

Overall Appearance

Participants were also asked to comment on the overall appearance of the new site. At the time of this study, most styling could not be altered, so we asked them to focus on general layout, neatness, etc. All participants noted something in this section; their responses included both positive and

TABLE 3 Terms on the New Web Site that Confused Participants

- "citation guides"
- "lots of course stuff because a special vocabulary arises locally"
- "music collections" versus "music special collections"
- "reference help" (note: "was it to find reference books or . . . to find help for research?")
- "remote access"
- "ILL"
- "technology" (note: "led me to believe I could find online electronic resources versus hardware-oriented stuff")
- "online research tools"
- "online listening tools"
- "citation"
- "tools" (note: "Sometimes I gravitated towards the word 'tools' when I was looking for assistance/resources")
- "resources," "research," "online" (note: terms like these "generally not helpful")

TABLE 4 What the Participants Loved About the Redesign

- "Certainly looks more modern (and more like the main library page). I like that all the links are visible when you first access the page—I never noticed before how much I'd missed on the old site because I rarely scrolled down! And the bold heading[s]/subhead[ings] with description[s] [are] easier to read; the overall look is more spacious, since the page isn't packed densely like the old page was."
- "Much clearer [and] better organized."
- "Much more balanced and not lopsided."
- "Clearer with more legible font and better visual orientation."
- "Colors, fonts, sizes are better than before."
- "I do not like the side bar in the old [Web site] so [it] is good that it is eliminated in [the] new [Web site]."
- "The pictures are welcoming!"
- "Thank you for getting rid of the small text links that were not even visible at first glance on the old Web site. Those were hard to read and seemed too confusing."

negative remarks. Positive comments indicated participants felt the site was more modern, clearer, easier to read, and visually appealing. When students were asked what could be improved, students requested making all clickable text consistently the same size and color and complained some pages were still too full or busy and it was not always clear when the user was no longer on the MPAL site (see Tables 4 and 5).

Observational Data

In addition to recording timing, success/failure, clicks, and participants' written feedback, observational notes were compiled during the sessions. Specifically, behavioral patterns and comments that indicated users' difficulty or enjoyment on the site were sought. For example, if a user repeatedly navigated

TABLE 5 What Some Participants Felt Could Be Improved

- "I would still allow the words under the bigger titles to be links to that specific part of the site. For example, under Collections (under 'About'), I would allow Collections to be a link and . . . it would take the user to a page devoted to collections."
- "Maybe the same material can be arranged better so that it is not as busy for [the] eyes to look at." (in reference to the Research Resources for Music, Dance, and Theatre page)
- "I might change the ordering of the main headings on [the] home page; 'About' is less interesting/helpful to me as a researcher."
- "It seems like there are only a couple of items that are buried . . . I prefer 2 clicks or less to find anything I need, or I start to think I might be lost!"
- "I think the new site needs a more consistent layout . . . and one color for things that can be [clicked]."
- "Isn't always obvious when I leave the Music library site and am on the Main Library site."

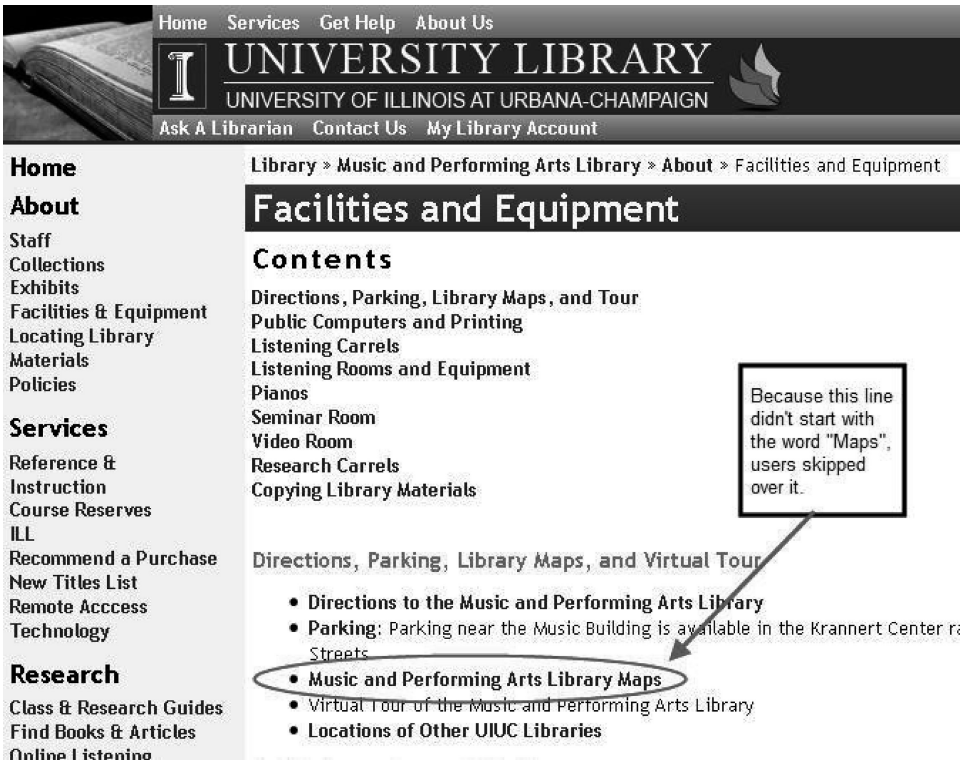

FIGURE 8 New Web site; focus on the location of the Maps link (cropped image).

to the correct page but failed to select the correct link, it suggested that there was a need to reword, relocate, or otherwise make the link more visible.

Scanning versus Reading

Our findings support Jakob Nielsen's (1997) assertion that users scan rather than read the Web. It was evident that participants were scanning pages, looking for keywords, often not even reading headings. One clear example of this was observed as users tried to determine the location of things in the library on Task 11, "On what floor of the library are the listening carrels/periodicals located?" Participants found the page that included a link to the library maps, but even with a heading that indicated maps were included in the list of links, most participants did not see the link—perhaps because the text did not begin with "Maps" but with "Music and Performing Arts Library Maps" (see Figure 8).

It was also observed that users would scan for the first instance of a word on a page, and if that did not take them to what they want, they would leave the page before reading the rest of it to locate the appropriate information/link (see Figure 9).

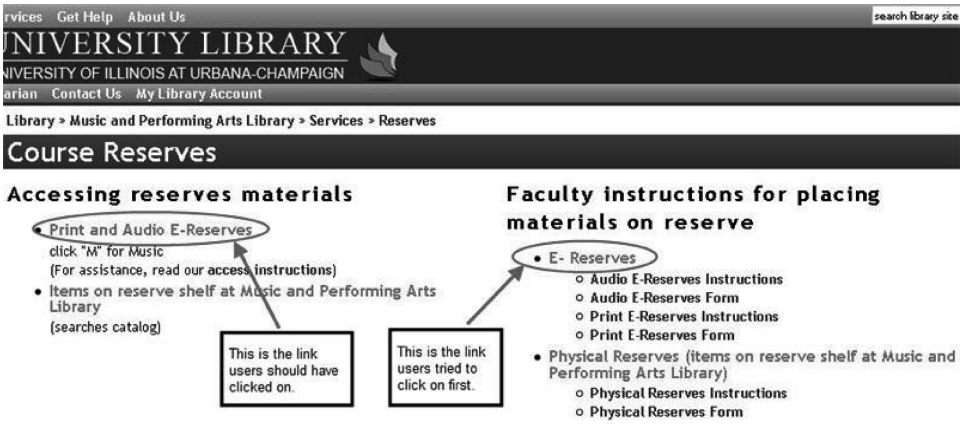

FIGURE 9 Users clicked on first example of word they saw (cropped image).

Terminology

We know that library Web sites, including ours, are beset with library jargon that is difficult for users to understand in the context in which we use them (Spivey 2000; Naismith and Stein 1989; Hutcherson 2004; Kupersmith 2009). Consider the use of terms such as "Online Research Resources," "Research Resources," "Internet Resources," "Reference Help," "Reference Tools." In their attempt to be concise, these labels impart little direct meaning. For example, the words "online" versus "Internet" and "tools" versus "resources," in particular, must seem redundant to users.

However, it is also clear that not all terms are confusing to all users, and it would be almost impossible to word the site concisely in a way that is clear to all users. As Cockrell and Jayne stated, "It is difficult to communicate effectively across the Web interface, especially to a diverse audience with a range of skills and experience. It is not easy to compress complete alternatives into short pithy descriptions . . . and the results are too often ambiguous" (2002, 129). A site that included a link for each individual tool that is offered would indeed be hard to navigate. Categorical terms and links to broader directory resources, such as Illinois' Online Research Resources, a resource finding tool, must be relied on to help patrons navigate the hundreds if not thousands of online tools to which they have access.

User Knowledge Base

Library research is not intuitive. There will always be a point at which users admit they do not know what to do with a specific tool. Finding journal articles seems particularly troublesome to users because the tools are specialized, the user interfaces are more complicated than other search engines

they have seen before, and their names are often acronyms or otherwise meaningless to the user (Cockrell and Jayne 2002). It was observed that the majority of participants tried to use the library catalog to locate journal articles, regardless of which version of the Web site they started with. Not only did the individual tools presented (e.g., Music Index, International Index to Music Periodicals [IIMP], Répertoire international de littérature musicale [RILM]) mean little to them, they truly had no idea what to do if they happened into the electronic resource locating tool (ORR).

When asking participants to find an online German dictionary, they looked only for links that said "German dictionary," and the broader term "reference tools" did not speak to them. It is arguable whether this is because "reference tools" is jargon or because users do not make the connection that a dictionary is a reference book and found in the reference section. Therefore, a link titled "Reference Tools" might lead them to dictionaries. Even when participants chose to do a keyword search of the Web site, they searched for "German dictionary" and not "dictionary" or any broader term.

Tools such as class guides also proved difficult for participants to find, in part because of terminology, but also because users do not usually encounter them until they have been introduced in class by the librarian who created the guide especially for that class.

CONCLUSIONS

Each user approaches the library with a different perspective and a different set of information needs. Since the library's Web site is often the first point of contact between the library and the user, it is imperative that library Web sites be designed with user input to ensure getting and keeping the user's attention. This usability study confirmed that redesign helped users find information more quickly and created a more enjoyable experience. It was also clear that having to click more than once is not a barrier to information—users are willing to click through to information on a well-organized site. Library jargon continues to be a problem for the Web site, but there is little consensus among users on the clearest way to describe library resources.

Some uncontrollable factors make it impossible for users' stated desires to be met. The University Library-wide adoption of the content management system and its templates mean that, by design, all our Web sites will look more alike—in fact, that was part of the goal. It also means we do not have control over what links look like before or after they are clicked. It would also take a considerable amount of engineering to make all links appear at the same point in the hierarchy of a page (i.e., H2, H3, or body text). Some users said they were comfortable with links that are no longer blue and underlined.

FIGURE 10 New site after testing.

However, changes were made based on the outcomes of the usability study and users' feedback. Many of the changes were minor: making link text and the main headings on the resulting page match, rearranging content to make it more navigable, and a few word substitutions/deletions. The new site with post-testing changes can be seen in Figure 10.

The site has now been live for a little more than a semester, and comments have been generally positive. As with any major change, there was a period of adjustment and orientation to the Web site's new structure. Performing ongoing site maintenance and conducting smaller focus groups or surveys to continue to make sure the site meets users' needs is anticipated. Since some pages are still text and link heavy, user studies may be conducted to determine if dividing the content into smaller pages would pose problems, even though this would require more clicks for the user. Card sorts may also conducted on terms used throughout the site to address both perceived library jargon and any remaining organizational issues. Further studies may also examine how users get to the right information: not just how long does it take them but what do they click on to get where they were going.

This study was designed to aid users in finding information and resources that should not be difficult to find (e.g., library hours, staff, contact information, locations of materials, the catalog, reference tools, etc.). Users will still require guidance and mediation from librarians in the form of reference interviews and help in finding and choosing appropriate resources. By its very nature, research is not an isolated activity, and we never want to promote it as such. We hope improving the Web site will help guide users to the resources and materials they need on a more consistent basis.

REFERENCES

Baldwin, Virginia, and Anita Breckbill. 2002. Use of main or branch library Web pages on public access computers in academic branch libraries: Results of a listserv inquiry. *College and Research Libraries* 63(5): 421–431.

Cockrell, Barbara J., and Elaine Anderson Jayne. 2002. How do I find an article? Insights from a Web usability study. *The Journal of Academic Librarianship* 28(3): 122–132.

Graham, John-Bauer, Jodi Poe, and Kimberly Weatherford. 2003. Functional by design: A comparative study to determine the usability and functionality of one library's Web site. *Technical Services Quarterly* 21(2): 33–49.

Hutcherson, Norman B. 2004. Library jargon: Student recognition of terms and concepts commonly used by librarians in the classroom. *College & Research Libraries* 65(4): 349–354.

Institute for Dynamic Educational Advancement. 2008. Finding information: Factors that improve online experiences. http://www.idea.org/find-information.html (accessed February 5, 2009).

Krug, Steve. 2000. *Don't make me think! A common sense approach to Web usability*. Indianapolis: New Riders Publishing.

Kupersmith, John. 2009. Library terms that users understand. http://www.jkup.net/terms.html (accessed May 14, 2009).

Naismith, Rachael, and Joan Stein. 1989. Library jargon: Student comprehension of technical language used by librarians. *College & Research Libraries* 50(5): 543–552.

Nielsen, Jakob. 1995–2009. Alertbox. http://www.useit.com (accessed May 14, 2009).

———. 1997. How users read on the Web. Alertbox. http://www.useit.com/alertbox/9710a.html (accessed March 5, 2009).

———. 2000. Why you only need to test with 5 users. Alertbox. http://www.useit.com/alertbox/20000319.html (accessed April 10, 2009).

———. 2006. Quantitative studies: How many users to test? Alertbox. http://www.useit.com/alertbox/quantitative_testing.html (accessed May 14, 2009).

Norlin, Elaina, and C. M. Winters. 2002. *Usability testing for library Web sites: A hands-on guide*. Chicago: American Library Association.

Pandir, Muzeyyen, and John Knight. 2006. Homepage aesthetics: The search for preference factors and the challenges of subjectivity. *Interacting with Computers* 18(6): 1351–1370.

Robbins, Laura Pope, Lisa Esposito, Chris Kretz, and Michael Aloi. 2007. What a user wants: Redesigning a library's Web site based on a card-sort analysis. *Journal of Web Librarianship* 1(4): 3–25.

Robins, David, and Jason Holmes. 2008. Aesthetics and credibility in Web site design. *Information Processing and Management* 44(1): 386–399.

Spivey, Mark. 2000. The vocabulary of library home pages: An influence on diverse and remote end-users. *Information Technology and Libraries* 19(3): 151–156.